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Improving Nebraska's Job Statistics: Learning From the Annual Revision to Nebraska's 1991 Employment Figures

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Introduction

Nebraska looked to be one of the leading states in the nation, if not the leading state, in job growth during much of 1991. Each month, reports of Nebraska's continued job growth made it appear that the state had somehow managed to escape the national recession.

Nebraska's apparent economic vitality caught the attention of the national media. The *Wall Street Journal*, citing Arizona State University, noted that "Nebraska increased non-farm employment at a faster pace than any state during March and April.... From January through April, the state added 34,000 non-farm jobs—a 4.8 percent increase over the same period last year. Over the same four months this year, non-farm employment nationally fell nearly 1 percent."[1] A similar article, focusing on Omaha, ran in *USA Today*.[2]

Then, in March 1992, an annual revision of Nebraska's job statistics erased much of the growth apparent in the earlier estimates.

This report addresses the question of why Nebraska's original 1991 job estimates were later revised downward so substantially. Also discussed are some potential impacts of the statistical revision and possible actions for improving the accuracy of Nebraska's job statistics in the future.

Why Job Statistics Are Revised

To be useful, job statistics need a degree of both accuracy and timeliness.

But the question is how accurate and how timely? Producers of state job statistics must make tradeoffs between the two. Within the constraints of a given budget and a given technology, the easiest way to improve accuracy is to reduce timeliness and vice-versa. The more time there is to compile and analyze input data, the more accurate the resulting job statistics will be. But the longer it takes to develop the statistics, the less useful they are for describing current economic conditions.

The current approach for dealing with this dilemma is to publish job statistics for the same month more than once. A preliminary figure (more timely, less accurate) is later superseded by two or more revisions (more accurate, less timely). Each succeeding estimate takes advantage of better input data that become available with the passage of time.

Under current procedure, the preliminary employment estimate for any given month is revised two or three times over a one to two-year period.

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Figure 1. Publication/Revision Schedule for Nebraska Job Statistics

Approximate publication date:	Nebraska nonagricultural wage and salary employment for the month of:											
	January 1991	February 1991	March 1991	April 1991	May 1991	June 1991	July 1991	August 1991	September 1991	October 1991	November 1991	December 1991
Jan 1991	----------											
Feb 1991	Preliminary	----------										
Mar 1991	Revised	Preliminary	----------									
Apr 1991	*	Revised	Preliminary	----------								
May 1991	*	*	Revised	Preliminary	----------							
Jun 1991	*	*	*	Revised	Preliminary	----------						
Jul 1991	*	*	*	*	Revised	Preliminary	----------					
Aug 1991	*	*	*	*	*	Revised	Preliminary	----------				
Sep 1991	*	*	*	*	*	*	Revised	Preliminary	----------			
Oct 1991	*	*	*	*	*	*	*	Revised	Preliminary	----------		
Nov 1991	*	*	*	*	*	*	*	*	Revised	Preliminary	----------	
Dec 1991	*	*	*	*	*	*	*	*	*	Revised	Preliminary	----------
Jan 1992	*	*	*	*	*	*	*	*	*	*	Revised	Preliminary
Feb 1992	*	*	*	*	*	*	*	*	*	*	*	Revised
Mar 1992	Benchmark	Benchmark	Benchmark	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk	1st Bnchmk
Apr 1992				*	*	*	*	*	*	*	*	*
May 1992				*	*	*	*	*	*	*	*	*
Jun 1992				*	*	*	*	*	*	*	*	*
Jul 1992				*	*	*	*	*	*	*	*	*
Aug 1992				*	*	*	*	*	*	*	*	*
Sep 1992				*	*	*	*	*	*	*	*	*
Oct 1992				*	*	*	*	*	*	*	*	*
Nov 1992				*	*	*	*	*	*	*	*	*
Dec 1992				*	*	*	*	*	*	*	*	*
Jan 1993				*	*	*	*	*	*	*	*	*
Feb 1993				*	*	*	*	*	*	*	*	*
Mar 1993				2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk	2nd Bnchmk

Figure 1 illustrates the publication/revision schedule for Nebraska's job statistics. The first (preliminary) estimate is published the month following the reference month. A revised figure is published two months after the reference month. Each year around March, job estimates for the most recent two years undergo a benchmark revision. Estimates for January, February, and March undergo one benchmark revision; estimates for other months undergo two benchmark revisions.

Why Nebraska's Preliminary 1991 Job Estimates Were Revised Substantially Downward

The annual benchmark revision of Nebraska's 1991 job statistics was quite large. For example, the preliminary work force estimate for December 1991 was 780,200. When the 1991 benchmark revision was published in March 1992, the new figure for the same month was 741,500. The annual revision reported 38,700 fewer jobs in December 1991 than did the preliminary estimate published just a few weeks earlier.*

A comparison of December 1991 preliminary job estimates with the corresponding first benchmark revisions for all states reveals that Nebraska's revision was of far greater magnitude than that of any other state. Thirty-one states had benchmark revisions of under one percent. Another eighteen had benchmark revisions of between one and 2.8 percent. Nebraska's benchmark revision was five percent. Thus, with the publication of first benchmark figures, Nebraska traded its number one ranking in job growth for a number one ranking in magnitude of statistical revision.

Table 1 shows states ranked by the percentage change of December 1991 employment estimates.

Why was Nebraska's annual revision so large? One reason, according to the Nebraska Department of Labor, was that the preliminary monthly figures had been inflated by a statistical adjustment that was added to the estimating procedure in 1991.[3] The adjustment had been recommended by the U.S. Bureau of Labor Statistics (BLS). Its purpose was to account for new businesses whose employment under normal circumstances would not be captured otherwise by the estimating procedure. Following the large benchmark revision for 1991, the Department of Labor returned to its previous employment estimation methodology without the adjustment. [4]

*The final (second benchmark) revision was published one year later in March 1993. The final revision put Nebraska's December 1991 nonagricultural wage and salary employment at 746,700—still 33,500 jobs (4.3 percent) below the preliminary estimate.

Table 1. States Ranked by Percentage Change of Benchmark Revision (absolute value) in December 1991 Estimates of Employees on Nonfarm Payrolls

Rank	State	Dec. 1991 Preliminary Employment (thousands)	Dec. 1991 First Benchmark Employment (thousands)	Revision Percentage Change	Absolute Value of Revision Percentage Change
1	Nebraska	780.2	741.5	-5.0	5.0
2	South Carolina	1,561.7	1,517.8	-2.8	2.8
3	California	12,856.3	12,520.4	-2.6	2.6
4	Rhode Island	435.4	424.4	-2.5	2.5
5	New Jersey	3,570.1	3,482.3	-2.5	2.5
6	Alaska	232.0	237.5	2.4	2.4
7	Ohio	4,953.1	4,842.2	-2.2	2.2
8	Maryland	2,140.3	2,096.4	-2.1	2.1
9	Connecticut	1,590.7	1,558.4	-2.0	2.0
10	Arkansas	971.6	952.4	-2.0	2.0
11	Florida	5,404.4	5,302.8	-1.9	1.9
12	New Hampshire	490.2	482.8	-1.5	1.5
13	Pennsylvania	5,171.5	5,094.8	-1.5	1.5
14	Arizona	1,548.1	1,527.9	-1.3	1.3
15	Oregon	1,277.5	1,261.5	-1.3	1.3
16	Missouri	2,337.6	2,309.0	-1.2	1.2
17	Illinois	5,284.4	5,223.9	-1.1	1.1
18	Virginia	2,884.3	2,854.4	-1.0	1.0
19	Kentucky	1,505.2	1,490.7	-1.0	1.0
20	North Carolina	3,140.2	3,111.7	-0.9	0.9
21	Indiana	2,558.7	2,536.4	-0.9	0.9
22	New York	7,930.4	7,862.7	-0.9	0.9
23	Washington	2,176.6	2,194.6	0.8	0.8
24	Montana	302.7	305.2	0.8	0.8
25	Texas	7,193.0	7,250.7	0.8	0.8
26	Oklahoma	1,200.8	1,208.6	0.6	0.6
27	Alabama	1,643.5	1,653.4	0.6	0.6
28	New Mexico	586.3	589.6	0.6	0.6
29	Hawaii	546.9	549.9	0.5	0.5
30	Wyoming	200.6	201.7	0.5	0.5
31	North Dakota	273.8	275.2	0.5	0.5
32	West Virginia	633.0	636.2	0.5	0.5
33	Mississippi	955.5	950.8	-0.5	0.5
34	Kansas	1,110.3	1,114.8	0.4	0.4
35	Idaho	405.8	407.3	0.4	0.4
36	Iowa	1,240.4	1,244.8	0.4	0.4
37	Wisconsin	2,317.9	2,312.3	-0.2	0.2
38	Colorado	1,571.8	1,575.1	0.2	0.2
39	Delaware	343.5	342.8	-0.2	0.2
40	South Dakota	301.7	301.1	-0.2	0.2
41	Vermont	252.1	251.6	-0.2	0.2
42	Massachusetts	2,814.7	2,819.7	0.2	0.2
43	Utah	763.4	762.4	-0.1	0.1
44	Tennessee	2,192.6	2,190.1	-0.1	0.1
45	Michigan	3,912.5	3,915.0	0.1	0.1
46	Maine	513.5	513.8	0.1	0.1
47	Nevada	643.2	643.0	-0.0	0.0
48	Georgia	2,965.0	2,964.6	-0.0	0.0
49	Louisiana	1,634.5	1,634.5	0.0	0.0
49	Minnesota	2,154.5	2,154.5	0.0	0.0

Sources: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings,* February 1992, pp. 104-21 (preliminary employment)
U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, March 1992, pp. 114-31 (first benchmark employment, except California)
U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, February 1993, p. 65 (first benchmark employment, California)

No doubt the inclusion of the statistical adjustment contributed to Nebraska's overly optimistic preliminary employment estimates in 1991. It was probably not the only cause, however. A second factor appears to have been an overreliance on year-ago trends to estimate current employment growth during a time of economic downturn. A review of statistical revisions over several years suggests that Nebraska's preliminary employment figures are heavily influenced by employment trends posted the previous year.

Ordinarily, preliminary employment estimates are based on employment changes reported by a sample of employers responding to a monthly survey. The Nebraska Department of Labor conducts the survey and produces the estimates in cooperation with the BLS.

If the monthly employment survey data begin to deviate from the historical trend, state analysts must make a judgement: Do the sample survey data signal a real shift in the state's overall employment picture, or is the change merely an aberration restricted to a few employers in the reporting sample? If the analyst judges the former, the change in the current month's survey data is given more weight in estimation procedure. If the analyst judges the latter, then the change in the sample data receives less weight; instead, the analyst relies more heavily on the month-to-month employment trend recorded the previous year.

While this is acceptable procedure according to the BLS, chart 1 suggests that in recent years Nebraska may rely on it too heavily.

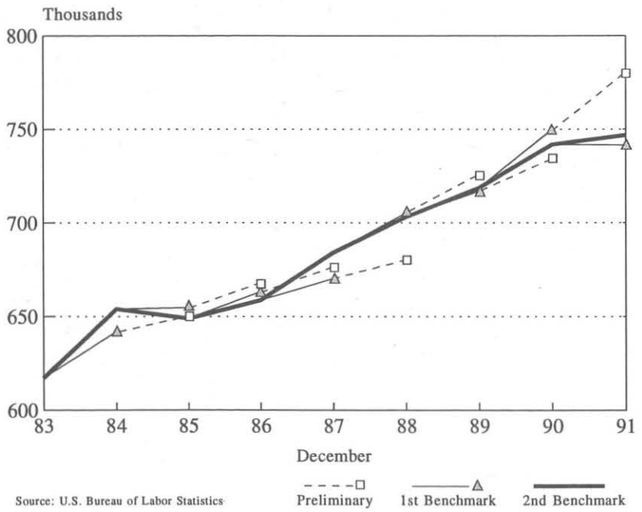
Chart 1 tracks three of the four Nebraska employment estimates for each December between 1983 and 1991.

The first estimate published, again, is the ''preliminary'' which comes out one month following the reference month. The second estimate published, the ''revised,'' usually differs little from the preliminary and is not included on chart 1. The third estimate published, ''first benchmark,'' is the first annual revision that comes out each spring. The fourth and final figure, ''second benchmark,'' comes out a year after the first benchmark.

The ''second benchmark'' line represents the most accurate, but least timely, measurement of how Nebraska's employment has changed from December to December. Following a downturn in 1985, this line picks up slightly in 1986 and then grows steadily from 1987 to 1990. Positive job growth continued between 1990 and 1991 but at a slower rate.

The ''preliminary'' lines represent the most timely, but least accurate, measurements of employment growth. While admittedly the least accurate measurements, they should still at least approximate the state's true job situation. The ''preliminary'' lines, then, should at least roughly parallel the ''second benchmark'' line for the same period.

Chart 1. Nebraska Employment Estimates



Source: U.S. Bureau of Labor Statistics

What happens instead, at least for the last four or five years, is that the ''preliminary'' lines roughly parallel the ''first benchmark'' lines of the previous year. This suggests that Nebraska's monthly employment reports are being more heavily influenced by what went on the prior year than by what is going on currently.

For example, between December 1986 and December 1987 Nebraska's employment really grew by 3.9 percent (second benchmark figures), yet the preliminary estimate showed only 2.2 percent growth. Why? Apparently because preliminary estimates were based in part on current survey data and in part on what had been recorded for the previous year. When preliminary employment estimates are made, the latest data available for the previous year is the first benchmark series. The first benchmark series grew 2.2 percent from December 1985 to December 1986. Apparently this rate of growth was factored into Nebraska's preliminary job estimates for the following year, thus keeping them artificially low.

The same thing looks to have occurred in 1991, only in reverse. While the national economy was slowly coming out of the recession, Nebraska's preliminary employment estimate showed 4.1 percent growth from December 1990 to December 1991. Why? One reason was the inclusion of the statistical adjustment for new business employment. But it also appears that again the preliminary estimates were based partially on what had happened the previous year, when employment growth (first benchmark) had been measured at 4.3 percent from December to December.*

To test this idea statistically, two linear regressions were calculated. The first measured Nebraska's preliminary employment estimates for each December from 1986 to 1991 as a function of second benchmark employment figures for the same period. The second measured the same preliminary employment estimates as a function of first benchmark figures for the prior year.

The first regression yielded an r squared statistic of .83, and the second yielded an r squared statistic of .99. This means that Nebraska's preliminary monthly employment estimates are more closely correlated with the estimated year-ago employment trend than with what eventually proves to be the current employment trend.

In steady economic times, it makes little difference whether the current job growth rate is estimated based on this year's data or last year's data. When economic conditions are changing, as they were in 1991, it makes a great deal of difference.

Nebraska's mechanism for estimating current employment levels failed to detect a turning point in the job growth trend. Unless steps are taken to reduce reliance on prior year data for producing current estimates, Nebraska's employment statistics will probably miss future turning points as well.

Why Nebraska's Preliminary Job Estimates Rely So Heavily On the Prior Year's Data

There may be several reasons why state employment analysts discount current survey data in favor of data from the prior year.

One reason could be that some industries have weak or unrepresentative samples of employers participating in the monthly survey. Employer participation in the current employment statistics survey is voluntary. If survey response for an industry is inadequate, then state analysts must base the monthly employment estimate for that industry on other sources. The most convenient alternative source is the industry employment trend posted the previous year.

Perhaps another reason stems from a lack of corroborating economic indicators for the state. At the national level, unusual changes in employment can be evaluated in light of other economic indicators such as consumer confidence, manufacturers' new orders, and so on. At the state level, there are few current economic indicators besides the employment statistics themselves. An absence of corroborating indicators can make it hard for state analysts to explain or defend employment estimates that differ greatly from the norm (the norm being what happened the same time last year). When deviation in the current survey data calls for a judgement, the analyst may find it easier to opt for the employment estimate that reflects expectations rather than the one that challenges them.

*The second benchmark revision put the final estimate of Nebraska's job growth between December 1990 and December 1991 at 0.7 percent rather than the 4.1 percent initially reported. The statistical adjustment added to the estimation procedure in 1991 probably accounts for no more than half of the initial overestimate in job growth.

Potential Impacts of Large Statistical Revisions

Current employment statistics can affect business location and expansion decisions, investment decisions, and our perception of state economic development efforts.

Business Location and Expansion. A business looking to relocate or expand evaluates potential sites based on several factors, one of which inevitably is work force size and growth trends. Inaccurate employment information can cause the state to be mistakenly excluded from consideration.

According to *USA Today*, "...Ford Motor Credit initially ruled out Omaha when it went looking for a new customer-service center: It was worried it wouldn't find enough workers. But Ford—eventually sold on Omaha's location and convinced it could attract workers who were underemployed in part-time jobs—came anyway."[5] More recently, the *Omaha World-Herald* described the initial feasibility study for the BMW plant: "These [215] areas were subjected to screening criteria such as: excellent supply of motivated, trainable employees ... A rigorous application of the process would have eliminated Omaha because of such factors as...low unemployment numbers, but, based upon [the consultant's] expertise and experiences in Omaha, it stayed on the candidate list."[6] Unemployment numbers are based in part on the monthly job estimates.

Investment. Investors consider a state's economic climate when deciding where to invest their money. If inaccurate employment figures lead investors to believe Nebraska's economic conditions are worse than they actually are, Nebraska borrowers could end up having to pay an undeserved premium to attract financing.

For example, an analysis of second quarter 1992 economic trends published by a Chicago securities firm ranked Nebraska's economic performance among the bottom ten states. According to the report, "A somewhat surprising first time entrant [into the bottom-ten list] is Nebraska, which had a big drop in employment..."[7] Nebraska's low ranking was undeserved and was the result of questionable methodology the firm used to compile its ratings. However, the sizable benchmark revision to Nebraska's employment compounded the problem by making it look as if the state had suffered a big employment drop when it really had not.

State Economic Development Efforts. Inaccurate employment statistics can lead to erroneous conclusions about the effects of state economic development efforts.

For example, in February 1992 the *Sunday World-Herald* ran a lead story titled, "Low Pay of New Jobs Forces Some People to Work Two." Citing preliminary employment numbers (at that time the most recent available), the article noted that "Nebraska generated jobs faster than any other state in 1991..." It then raised the question of how Nebraska could have sustained so much job growth without corresponding population growth—"more jobs than people":

"The state has added nearly 62,000 jobs in the past two years. The most recent population data indicate that Nebraska added only 8,600 people in an entire decade: 1980 to 1990."[8]

The article suggested that the bulk of the state's new jobs were in the service sector and provided either low pay or only part-time work. As a result, more people must be working multiple jobs, and that explained why Nebraska's reported job growth far exceeded population growth. (Current employment statistics count persons on payrolls equally without regard to the number of hours they work.)

Appropriately, the article also raised the question of how much LB 775 (the Nebraska Employment and Investment Growth Act) had contributed to the apparent job surge. No doubt many people were led to conclude that LB 775 had helped create a lot of low-paying and/or part-time jobs.

The annual benchmark revision to the state's employment figures was published a few weeks after the article ran. According to the revised numbers, Nebraska added about 28,200 jobs between 1989 and 1991. One year later (March 1993), the final (second benchmark) job statistics were published for 1991. The final figures now show that on an annual average basis Nebraska added 31,200 jobs—not 62,000—between 1989 and 1991.

Much of this 31,200 increase in jobs may be attributable to an increase in the percentage of people working, not to an increase in low-paying, part-time jobs. Between 1980 and 1990, the bulk of the baby boom moved into the age brackets where labor force participation is the highest (ages 25 to 54). At the same time, more women entered the labor force.

Given the revised job figures, there is no evidence to believe that the percentage of Nebraska workers holding multiple, part-time jobs was significantly larger in 1991 than it was five years earlier.

Improving the Accuracy of State Job Statistics

Granted, any inaccuracies in preliminary employment figures are corrected eventually through the benchmark revision process. Nevertheless, there are some compelling reasons for improving the accuracy of Nebraska's preliminary job figures.

First, the expectation that even the preliminary job numbers at least approximate the real rate of job growth is fundamental to any effort to understand current economic conditions in the state. As discussed, our perception of current job growth can affect business and investment decisions as well as public policy.

In addition, most people use and remember the preliminary figures, not the benchmark revisions that come out months after the fact. Preliminary job figures for last month make bigger news stories than do revised figures for one or two years ago.

First impressions tend to be lasting, and inaccurate ones are not easily corrected. Once people have the idea that Nebraska lacks a supply of available workers for new business, or that Nebraska is not a good place in which to invest, or that in recent years Nebraska has managed to add only low-paying, part-time jobs, it is little consolation to learn months later that we were mistaken.

It therefore seems appropriate to consider what might be done to help make Nebraska's monthly job figures more accurate. Some possibilities follow:

1. Employers could help by responding to the Nebraska Department of Labor's monthly employment survey. Many respond when asked, but some—including major employers—refuse to participate in the survey.

2. Nebraska might consider making employer participation in the survey mandatory rather than voluntary.

3. Additional training for state staff involved in producing employment estimates might be helpful.

4. Each month, the state conducts a review of the tentative job estimates prior to their release. In industries where the current survey data are questionable, the reasonableness of the tentative estimates is evaluated largely by comparing the current month-to-month percentage change with the change posted for the same period a year ago. This is a reasonable comparison, and it is convenient to make since the historical job figures for Nebraska are already stored on the state's computer system.

   An equally reasonable (but less convenient) comparison would be to look at current industry growth rates for the nation and/or surrounding states. This receives little, if any, attention in the review process—probably because current data for areas outside Nebraska are not on the state computer. So doing, however, would offer some balance and outside-world perspective to the review process. In industries where there are inadequate or questionable Nebraska survey data, current employment information for surrounding states and/or the nation should receive as much attention as historical information for Nebraska.

5. The BLS might facilitate this by setting up a mechanism for telecommunicating current industry employment data among states.

6. For those instances where historical growth rates must be used in the estimation process, state analysts should consider averaging the month-to-month industry growth trend for several years rather than using only the prior year's trend.

7. The BLS might also conduct or sponsor some research into better understanding what factors affect the quality of state employment estimates. For example, what is the relationship between the accuracy of state job estimates and such factors as the level of employer participation in the survey, the background and experience of state staffs, the degree of automation, and so on?

8. Nebraska should set up a task force to explore the development of additional economic indicators. Such indicators could help corroborate federally sponsored employment estimates as well as address questions of state and local importance such as: Exactly what kinds of new jobs are being created in Nebraska? What do they pay? What are the labor force experiences of Nebraska's recent high school and college graduates? Where will the state's future workers come from?

   The state could use its existing administrative data bases in creative ways to address these questions. The costs would be small, and the benefits to policy-makers of better information about state and local labor markets could be substantial.

Summary

Nebraska's mechanism for estimating current work force growth missed a turning point in 1991. Part of the reason appears to stem from an overreliance on prior-year data to produce current-year estimates. Nebraska's current employment statistics run the risk of missing future economic turning points unless improvements are made to the estimation process.

Work force growth is a key economic indicator. It affects business and investment decisions as well as public policy. The state and federal government should work to improve the accuracy of current employment statistics. At the same time, Nebraska ought to explore ways to use its administrative data bases to supplement such statistics with state-developed economic information aimed at meeting specific state needs.

Along with encouraging the creation of new and better jobs, Nebraska needs to encourage the creation of new and better economic information. The state should improve its capacity to track job growth, understand the changing economy, and measure the results of economic and social policies.

Endnotes

1. Michael Selz, "Nebraska Enjoys Thriving Crop of Small Businesses," *Wall Street Journal*, 2 July 1991.

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3 Jim Rasmussen, "Job Growth Overstated in Estimate," *Omaha World-Herald*, 19 March 1992.

4. Ibid.

5. Wiseman, "Its Prosperity Puts Corn-fed Image to Rest."

6. James A. Schriner, "The Secret Mission That Made Omaha a Global Competitor," *Omaha World-Herald*, 26 July 1992.

7. Bradford N. Langs, Kemper Statewide Economic Trend Indicator Analysis, 1992-Second Quarter (Chicago: Kemper Securities, Inc., 1992).

8. Jim Rasmussen, "Low Pay of New Jobs Forces Some People to Work Two," *Sunday World-Herald*, 23 February 1992.

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